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ABSTRACT

This conference presentation, which is divided into three parts, deals with problems facing the educational system, the concept of entropy and its relationship to vocational education, and the need to develop "technical generalists." The first part stresses the responsibility of the American school system in remedying the many social problems caused by poverty, unemployment, the aging of the U.S. population, and the social and economic costs of illiteracy. The second part recommends that vocational educators work to generalize skills, develop a common set of attitudes, foster common expectations, and teach curriculum commonalities. This can be accomplished through complexity, organization, separability, continuity, sequentiality, interdependence, and self-regulation. The third, and longest, part of this document explores the implications of the concept of entropy for vocational-technical education. A model is presented for restoring the public school system to a well-ordered, well-functioning state by providing a general and flexible form of vocational education that is used to train individuals to be more than specialists in a technical field. Rather, the proposed program would stress techniques for evaluating, transferring, and reinforcing knowledge to other areas. (MN)

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MEMO

DATE: January 4, 1988
TO: Whom It May Concern
FROM: Dr. Paul D. Collins
RE: 1987 AVA Convention
Las Vegas, Nevada
December 4-7, 1987

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TO THE EDUCATIONAL RESOURCES
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The Triumph of Circumspection?

A variable within a system, no matter how minute, will someday come to dominate the system. This principle was much in evidence in the Las Vegas convention.

Examples:

1. The Economic Development Group at Des Moines Area Community College under Pam Van Ast in educating generalists who specialize in process. They have done this successfully for 51 companies with 4,093 new employees.
2. John E. Nehan, Manager of International Activities, Agency for Instructional technology, Bloomington, Indiana has and is designing curriculum to help students think in terms of systems instead of narrow specialization. They can adapt and re-train with greater ease.
3. Chris Blizzard and Gloria Purrell of Productive-- Quality Systems, Inc., Dayton, Ohio, said its generalized, industry specific Vocational Education that's needed now, "The old way of doing business is gone-- the Quality Revolution requires that things be done differently."
4. Drs. Jimmy McCully and Rebecca Love-Wilkes of Research/Curriculum Unit at Mississippi State have developed work-team, cross-training units for secondary schools and are at work on post-secondary. It's wonderful strange to see Mississippi outpace Minnesota in any area of education.

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From 4:00 P.M., Friday, December 5, until 12:30 P.M., Monday, December 7, the call was for CHANGE. Not cosmetic, nor contrived, but real CHANGE in our inert educational system. There is great irony here. Irony in demanding multiple, competent, skill mastery in teachers e.g. learning, clarity of structure, accountability, mastery in evaluation techniques, dealing with individual difference, climate setting, supervision et.al. so they may teach fragmented students in a rigid structure.

"Teaching multiple--reinforcing--analogous skills to students is too simple for Minnesotans. You've got to make it more complex, lard it with felt needs in the affective, cognitive and attitudinal domain to sell it in Minnesota." A California vocational educator.

A Ms. Swin, delegate from Michigan with Quality Productivity Contract Services to Industry said, "You can't get high quality and low cost out of low quality components." She quoted W. Edwards Demming at length on the costs of poor management. "Forty percent (40%) of the costs of American products are because of waste, scrap, re-work, (40%). Make the product right the first time. Start with the workers. The more skills the worker has, the more productive they are and the higher the quality of the product." She quoted Secretary Benett "Schools are not underfunded just underproductive. Work what you talk, educators do mouth anything."

Gordon Rapp--Glen Selby each 40 years in the steel industry graduate engineers spoke of the costs to society of the dropouts (the ultimate dropout is in prison). "It's a Socio-Economic* problem for all society."

Dr. Brenda-Holmes, Executive Director, District of Columbia State Council on Vocational Education, Washington, D.C., "Your going to have some administrative shake out, administrators who won't be administrative leaders anymore. But then, they shouldn't be administrators anyway. The legislation is coming. Teachers and students have to do things they don't want to do so why shouldn't administrators, move the egos out of the way."

Dr. Shirley Chase the Ohio Center, "We have grave problems with vocational educators teaching academic subjects, or basic skills in shops and labs, problems of meeting state graduation requirements and transferability."

While all this and more was going on, power brokers were off somewhere making decisions about the future of Vocational Technical Education. These decisions will be promulgated on a need to know basis and brought into the light as a dynamic answer to real needs. In the meantime the variable in the system increases its oscillation and Occam's razor is ignored. We are numbed by circumspection. Attached to this memo is a copy of my speech to the delegates and the variable, a plan for educating Technical Generalist. The problem is well defined, here is the solution, now, lets get on with it!

*Please note these terms and their synonyms The Technical Generalist

Speech to the National Convention
of the American Vocational Association
in Las Vegas, Nevada
December 6, 1987

Ladies and Gentlemen:

This presentation has three parts:

Part I deals with circumspection, the uneducated and undereducated and a response.

Part II deals with entropy in our system.

Part III deals with the Technical Generalist.

PART I

My studies and observations have led me to conclude that we are existing in a cemented state of circumscribed self-deception.

A state where shared complaints and resentments bind sufferers together. Frustrations are natural and inevitable and are borne with fortitude because others have it worse and we are told that progress is being made elsewhere.

Our children and our children's children will have it much better if only we hang on now. Hang on in self-deception and perplexity.

A spiritual malaise sets in as some of our appointed experts become obsessed with image, others manifest a deliberate vagueness and emotional impoverishment. Still others become frantic, driven; trying to make meaning out of an education that is so-so.

Difficult because in the last analysis, so-so is just so-so, and all things at rest look alike. Yet great sums are spent developing ideological justifications for preserving the status quo.

All is tottering. All is out of frame. Look at the moral atmosphere and character of government, this has much to do with the incidence of hypocrisy in a country. And there is a glaring reluctance to attribute great negative consequences to stupidity.

Failure is almost never at the cost of those responsible.

Our political leaders' esteem obscures and is dissimulated by it. They keep it vague and immeasurable. Just like educators.

In politics and education, we have lengthy pronouncements on alternatives never meant to be realized, this type of circumspection

will paralyze any audience. We acquiesce in pluralistic ignorance.
Life is a bitch - and then you die.

We are overwhelmed by sincere altruistic humbug and mummery that
supports our world. We're made numb by circumspection.

Everywhere in economics, politics, law, and education, the
illusion of certainty.

We preach the nobility of the work ethic, technology, science,
piety, frugality, sobriety, and watch the mad scramble for money,
power, authority, and indulgence.

A cognitive dissonance results; why limit yourself -- indulge
yourself. And yet

There is a growing sense that something is fundamentally wrong.

We ache at contrived change. We are tired of being told what we
already know. We are fed up with sloppiness, incompetence, ragged
performance, and masquerade. How do you overcome the ho-hum when you
can't locate the source or identify the author?

Has circumspection produced an authoritarian adjustment of
conscience to circumstance?

Are we undone?

Are we technological junkies with no need to know the whole
design or dynamic, fragmented people living in perplexity. What does
Bloom say?

Mismanaged, misused, unable to recognize anything unless it
glitters.

Nothing in education is so astonishing as the amount of
ignorance accumulated in its inert leaders, most of whom are
overwhelmed by their own praise.

1. 47 million people in America hold jobs that pay less than \$11,000 per year. Salaries not much above the dole.
2. Pauperized people are unemployable.
3. The U.S.A. is 9th in per capita income and has the slowest pace growth in the Western World.
4. By the year 2010, 70% of the U.S. population will be over the age of 55.
5. In Minnesota, it costs \$23,000 a year to keep 1 person in prison and 60% of these inmates are illiterate. Nationally we are building more cells than classrooms.

All of this and more convinces me that social problems are not individual, but social and the buck stops on the doorstep of the American educator.

Inadequate education is the root cause of the rise in the non-worker and the criminal.

Some say that change will produce chaos in our schools, in our schedules, in our organizations, and we must subvert change, make it cosmetic.

We must stabilize misery and distress by social engineering and urge the disincorporated to resort to religious solace as a substitute for action.

Or let's blame the poor for their own distress, a view they will come to adopt. This becomes common sense - accepted - universal - a given, it legitimizes the system's values. We can, by circumspection, acknowledge guilt without reform. But it doesn't work!

The technology won't work without the many-sided talents,

skills, and knowledge of the most adaptable people. The cutoff comes with educational attainments. They polarize society into the haves and the have-nots. As the technology becomes more sophisticated, more are left behind. They become objects rather than subjects of their lives. The discontent we hear may not be articulate, but it is vehement.

Let's let each person be their own model; extend them, not subordinate them.

Continued widespread social injustices and inequality challenges the very idea of democracy. Felix Rohaty says, "that a democracy must appear to be fair - this is no longer the case in America." Yeah! But what the hell does he know? Who the hell is he anyway?

Does V.E. indefinitely extend and challenge the powers of the individual or react to short-term market demand? Well, some would have you believe that schools perpetuate inequality and class difference by regulating access to knowledge.

It couldn't be further from the truth. Power relationships don't shape access to technology, education, and employment. They don't?

Wait a minute. What is the moral atmosphere of education? Of educators? Is the U.S. an underdeveloped nation filled with fractional people narrowly educated?

Higher and wider skills are needed in V.E. sophisticated cross discipline, multiple reinforcing generalized V.E. That's what's needed. A holistic structure is what's needed in education. New combinations of standard materials in a changed presentation. Present curriculum is focused on fast disappearing careerism. It's being made obsolete by changing technology. We need different

combinations, a shift in mind-set.

Excellence is defined as grace under pressure. Staying calm under pressure and doing the job to the best of your ability.

Not doing the extraordinary, but doing the ordinary well -- consistently.

At the end of life, your left with only accumulated excellence. It's called dignity. If you lead your students out and let them taste excellence, they will never be satisfied with the mediocrity or circumspection.

PART II

I wish to communicate three things to Vocational Educators.

- 1) I want to define entropy as I understand it.
- 2) I want to examine it as it applies to vocational education.
- 3) I want to make a recommendation.

Entropy (or times arrow) is seen as that condition where the lack of order, information, and energy prevent useful work.

According to Moore, you can't win; the best you can do is break even, you can break even only at absolute zero and you can't reach absolute zero.

Boltzman said that all systems deteriorate, going from high order and low entropy to low order and high entropy.

Shannon states that entropy is linked to information.

Weaver says that in highly organized systems with little randomness or choice, information is low.

Kelly, Tillman, Russell and Hofstadter say we identify meaning in information by perceiving that a message exists and then use the appropriate method to extract it. You will get noise or meaning.

Schrodinger states that as long as systems dissipate the entropy they create by the intake of new information, they avoid disintegration.

Palgar says that evolution by replication and environment modification retards entropy.

Marwitz states flatly, information is the source of order.

Rifkin says that successive economics and social organizations have developed with successively more sophisticated means of extracting energy, and we are at a watershed in energy and social systems.

Rothstein states that organizational capability of a system parallels channel capacity.

Davis says that vocabulary control and subject classification increase order in stored information.

So? So what is the meaning of this in vocational education? What does vocational education contribute to the order, information flow and useful work in industry and society? And further, is vocational education the appropriate method for extracting meaning, providing new information, new order, and new life in a society that is, (if Boltzman's law is correct) sliding fast into catastrophic irreversible entropy?

What is the channel capacity of vocational education? What determines vocabulary control and subject classification and is the information stored or free flowing in vocational education? Can we increase the power and effectiveness of vocational education without increasing its complexity?

*What is the best possible probabilist use of vocational education? Not from the view of the supplier but the user.

What is the best way to deal with the uncertain and ambiguous future?

Are the goals specified in the vocational education system the correct ones in terms of all those in the system, or are they dangerously narrow and self-centered? Is our inner sub-system adapted to the outer environment? Or are we giving the students a one way ticket to

unemployment?

Does our system work?

For whom?

For how long?

For what?

What the schools teach is of vital importance. If it is more selfishness and greed, psychic entropy is assured.

Look around you in the world. Do you see a real growth in human love and understanding? Have our institutions been overtaken by events? Most of the work we do is becoming economically meaningless: As is the very concept of work, who knows what new kinds of work will emerge.

With the present practice of our educational system, what will the students be prepared for? What work will they turn to? How long will human labor be cheaper than robots?

How long do the welders, painters, machinists, toolmakers, machine operators, inspectors and assemblers have? How long do they have before they are shunted into service jobs in a secondary labor market? What are the unemployed to do in an economy that doesn't require millions of manual workers?

Perspective and self interest makes some want to keep the answers vague. What is the balance to be struck between what is technically possible and economically rational? First generation robots replaced workers at the rate of 2½ to 1, second generation robots do it at the rate of 10 to 1. In essence it is not technical complexity or economic or technical rationality but power and political choice. What about retraining industrial workers and finding jobs for the yet unborn?

The consequences of the engineers ingenuity, are whose responsibility? Dislocation, distress, unrest will be overcome, by long term benefits,

for whom?

What about the unions whose members' jobs are being lost to robots or foreigners? Yes, what about them? How will they organize a huge permanent workless class? Their membership has dropped from 32 million in the 1970's to 18 million today. Yes, how about the unions?

What to do with the fortress mentality, the smugness, the complacency at mediocrity which is now standard? What to do about the elaborate alternatives for maintaining the status quo? What to do about the earnest platitudes and fearful self-righteousness that have replaced reasoned argument? What to do about circumspect?

Yes what to do about the reduction in the numbers of students.

What to do about dwindling resources

What to do about special interest groups

What to do about legal, judicial, and political intrusions

What to do about demographic and sociopolitical considerations

What to do about the fact that control has passed out of the hands of educators and into others' hands whose motives are not known.

In the past vocational education has not been supportive of critics inside the system. This forced consensus has resulted in loud criticism from without, and loss of control.

Will vocational education continue to fight a rearguard holding action till overrun?

Will vocational education content itself with cosmetic innovation?

Vocational Educators:

The bell tolling in the distance is tolling for all of us!

Opinion polls are no substitute for wisdom and judgment, and remember, demographers count everything and value nothing. Fads in education have trivialized it - it is an activity of the utmost importance and is often not easy or pleasant.

The increasingly sophisticated economy requires more education, at a higher level of training, not just for the few, but for the many. Sophisticated, cross discipline, multiple, a reinforcing, generalized vocational education. (Heads on - then hands on or the student will maim or kill himself or others)

The new depends on the knowledge pool and this depends on the information flow and you must bring them all in.

Is vocational education efficient? Is vocational education flexible? Is vocational education resilient? Can it meet the challenge? Is it up to tangential change with new emphasis on the early acquisition of cross disciplinary multiple skills?

Yes! That and more! The age of certified make-believe is over. Where does the person with one skill go in this age of change? Specialized education has too often produced formalized conforming, unpliable workers that are narrowly practical with limited competence in narrow fields, not people with breath, originality and creativity. They fit well into a vanishing job market where 80% of the jobs have been deskilled - dumb - down and far too often vocational education has stepped in to re-train these obsolete specialists, in new specialties, soon made obsolete.

Where does all this lead? It leads to whirling incoherence, manipulation, dependency, imposed needs, stifled growth, isolation, entropy and absolute zero.

Slogans, posturings, and heady pronouncements won't cure the P.C.B.s in our food, the radio activity in our water, the carcinogens in our lungs, the red ink in our bank accounts or the 25% drop-out rate in our schools. Those who use complexity, secrecy, bluff and

smugness close the channels of communication and prevent themselves from seeing the progress of their own disease.

Our students come to us brutalized by movies and stupified by T.V. We offer a mockery of pretended choice which is accepted because there is no alternative. We have had 100 years of specific skill job training to reduce poverty, shiftlessness and more decay.

Vocational Educators - Look around you, at our society!

General flexible vocational education has been realized in specific skill training where specialists

- Exclude what is convenient not to know
- Are denied knowledge from a full range of life and work
- Controlled by conventional thinking which is hostile towards the non-conformist, intolerant of the new, fierce in public puritanism, and rigidly patriotic
- Are captives of established structures whose goal is simplification and convenience

Vocational Educators look around you, at our society!

Confront the question! What should we do? Ask the hard irritating question and you will get the answer.

We can let the closely linked variables in vocational education interact dynamically for survival. New multivariate approaches are necessary—cross fertilization - new analogies - new relationships.

We can synthesize the elements into a coherent pattern of:

- 1) Generalizing skills
- 2) Develop a common set of attitudes
- 3) Foster common expectations
- 4) Teach curriculum commonalities

It's all connected by:

- 1) Complexity
- 2) Organization
- 3) Separability
- 4) Continuity

- 5) Sequentiality
- 6) Interdependence
- 7) Self-regulation

It's all connected, let's teach it that way! Let's give the students generalizable, multiple, reinforcing skills. Let's give them the skills before the life is lived.

The goals of all education is freedom, human emancipation. This is achieved as it has always been achieved by us; the educators, the researchers, the planners, the administrators, the teachers; we, we; must make it happen, we must make the tangential change and we must make it now!

It's all connected, all part of one great whole, and if we might see it as the poet Blake saw it

"A world in a grain of sand
A heaven in a wild flower
Hold infinitely in the palm of your hand
And eternity in an hour"

PART III

The Technical Generalist

Emergence Of The Technical Generalist

By Dr. Paul D. Collins



THE EMERGENCE OF THE TECHNICAL GENERALIST

by

Paul D. Collins, Ph.D.

Cover by: Joan Kantas
Karen Ritter

Union Printed

INTRODUCTION

Our system of human capital formation in this post industrial society appears to be in entropy.

If the reader permits, I wish to define entropy as I understand it, show how it applies to our system, and finally make a recommendation for change with a proposed plan for accomplishing it.

The first part of this work deals with concepts gleaned from my studies of information science and presents the philosophical background of the problem. The second part gives concrete evidence in support of the call for change, and the plan itself. The third part presents the problem and its solution in graphic form. It should be remembered that the model in part three is just that; and amenable to change itself. These changes dictated by the needs of the reader.

PART I

Entropy or (times arrow) is seen as that condition where the lack of order, information and energy prevent useful work. Vico taught us that all systems are cyclical in nature and deteriorate over time unless reinforced from the outside. The implementation of a cardiac pacemaker in the human body would be a ready example of such an outside reinforcement. You can't win, that is, reverse the deterioration that is present, but you can break even by re-establishing order in a deteriorating system. In this case, the normalizing of an irregular heart beat. Systems; all system deteriorate over time, going from high order and low entropy to low order and high entropy. This entropy in social systems is linked to information flow. In a highly organized system; say a school system, with little randomness or choice, information is low. For many; school systems across the country are seen as lacking meaning and producing noise and disorder. They are no longer viewed as being the place where meaning and information can be extracted. The public school system has not been able to dissipate the entropy created, but rather it institutionalized it. As a consequence of which, it is in disintegration. The U.S. public education system as presently constituted, blocks the intake of new information with rigidity and entrenched interests and engages in cosmetic change on a wide scale by touting every mindless fad and frippery as educational reform. A genuine environmental modification is past due. It won't eliminate entropy, but it will retard it. This modification is the source of order, this source of order is information. We are at a watershed in economics, social organizations and educational systems. We need a new, more sophisticated means of extracting meaning and energy. In this case it is education, but in other cases as

well. Labor organizations, the environment, and wealth distribution systems are other systems in entropy. The capacity for regeneration parallels system capacity. The size of it tells you the size of the problem and the size also tells the capacity for renewal.

So what is the meaning of this? What does education, general and vocational, contribute to the order, information flow, and useful work in industry and society? And further, is education, general and vocational, the appropriate method for extracting meaning, providing new information, new order and new life in a society that is (if Vico is correct) sliding fast into catastrophic irreversible entropy? What is the capacity of education? Is the information stored or free flowing? Can we increase its power and effectiveness without increasing its complexity? What is the best problistic use of the educational system? Not from the view of the suppliers, but the users.

What is the best way to deal with uncertain and ambiguous future?

In order to answer these questions, we must focus our inquiry. That being the case, I would now focus on vocational education, an educational phenomena I have observed closely for the past twelve years.

Are the goals specified in the vocational education system the correct ones in terms of all those in the system, or are they dangerously narrow and self-centered? Is our inner sub-system adapted to the outer environment? Or are we giving the students a one way ticket to unemployment?

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in our food, the radio activity in our water, the carcinogens in our lungs,
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My fellow citizens - Look around you, at our society!

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the planners, the administrators, the teachers; we, we; must make it happen, we must make the tangential change and we must make it now!

I would now turn to examine in detail some of the social problems that afflict this country. I intend to show that a great many of them are caused by the job and can be solved by the plan recommended at the close of this book.

PART II

There isn't time to list all the social problems that have been defined. My purpose here is to list some of them, then comment on them, and if possible draw out a common thread and weave it into a solution for the problems discussed. Let's understand from the start that this presentation is an answer to some, not all, of the problems.

The Problems:

Our country, our society, many of our fellow citizens seem steeped in apathy. Outrageous political, religious, economic news is greeted with silence or cynicism. Some contend that our democratic experiment is in entropy, and dying cultures are apathetic ones. That there is great isolation, loneliness, estrangement among the members of our society is seen clearly when we examine, for instance, the statistics for just one year, 1979. There were 1,181,000 divorces, 20,678 murders, and 27,300 suicides in the U.S.A.¹ There are said to be 10 to 20 million chemically-dependent people in our society today.²

Alienation, depression, estrangement, job dissatisfaction, poor motivation end in statistics like those cited above, but are manifested earlier at home and particularly on the job. They are manifested in theft, absenteeism, and sabotage. Consider the following: "Stealing by workers is extremely significant and permeates all aspects of the economy. It involves virtually all sectors and all levels of the corporate hierarchy, from high-level administrators through unskilled labor."³

¹U.S. Statistical Abstracts

²Ramsey County, Minnesota, Mental Health Center, October, 1982.

³M. Roy Perryman, "A Neglected Institutional Feature of the Labor Sector of the U.S. Economy," Journal of Economic Issues Vol. XV, No. 2, June, 1981, P. 387

Or that --

. . . In 1979 employee theft currently exceeds \$10 billion annually . . . one-third of all business failures are largely and directly attributable to internal theft, and on the average every adult in the United States pays an EMPLOYEE THEFT TAX of about \$200 per year as the incidence of shrinkage cost associated with stealing is shifted to the customers.⁴

Or --

. . . about three-fourths of all inventory losses are a direct result of internal theft.⁵

Or we might ask why? Perryman answers,

. . . One characteristic of the contemporary work force that contributes to stealing is the boredom associated with many jobs at all levels of the corporate hierarchy. A related factor is frustration with the work environment.⁶

Alienated, depressed, dissatisfied workers will find an outlet for this inner turmoil, and they often do it by theft.

. . . There is a direct and significant relationship between employee theft perceptions and worker alienation, that is, alienated workers are more prone to theft . . . motivated workers are less likely to steal than their peers . . . high-level satisfaction with any aspect of the⁷ work environment translates into lower propensities for internal theft.

What is the solution so often put forth to, and by, the business community?

It is to spend more millions on elaborate and sophisticated security systems.

. . . Industry pays \$6.6 billion a year for security prevention programs and hardware.⁸ By 1985 security expenditures are expected to jump to \$30 billion.

⁴Perryman, p. 388

⁵Perryman, p. 388

⁶Perryman, p. 389

⁷Perryman, p. 391

⁸Richard F. Tersine and Roberta S. Russel, "Internal Theft: The Multi-Billion Dollar Disappearing Act," Business Horizons, Vol. 24, No. 6, Nov-Dec, 1981, p. 11

The policies most frequently adopted by business organizations to reduce employee theft appear capable of leading directly to its proliferation because they deal with the effect, not the cause. Job-enhancement strategies, on the other hand, should reduce the aggregate propensity to steal. Common understanding has it that in round numbers, 25% of the work force will never steal; 50% won't steal if the circumstances don't permit it, and the job doesn't demand it, the final 25% are thieves who must be weeded out. Poor communication, monotonous work and the little prospect for promotion contribute to theft and often cause it. Employee theft is an inexpensive form of job enrichment.

An interesting contrast is presented when we see, ". . . estimates of internal theft range from \$4 billion a year to \$44 billion . . . by contrast street crime totaled \$4 billion a year."⁹

It is a negative national transfer of wealth ". . . internal theft amounts to nearly 1.3% of our gross national product."¹⁰

The often-heard rationale for theft is that everyone else is doing it. But, practice doesn't sanctify any act even if honesty is often intolerable in a dishonest environment. Stealing satisfies other than monetary needs, ". . . it serves the same purpose as sabotage and yields more personal benefits."¹¹

Stealing is an attractive rational option for the typical alienated, depressed, estranged, dissatisfied, poorly-motivated employee. How about absenteeism? ". . . during a typical week, about 5 million workers are absent from their jobs."¹²

⁹Tersine, p. 11

¹⁰Tersine p. 12

¹¹Tersine, p. 15

¹²Carol Boyd Leon, "Employed but Not at Work: A Review of Unpaid Absences," Monthly Labor Review, Nov. 1981, p. 18

Or, consider that,

. . . American workers with full-time wage and salary jobs lost about 95 million hours a week in May, 1979. Their percent of time lost fluctuated from 3.3% to 6.7% from 1973 to 1979."

In addition to this,

. . . the individual who feels discouraged about his work . . . is frequently absent, and displays aggressions and will be more likely to steal.¹³

By 1983, ". . . the annual bill for pilferage will come to \$53.7 billion."¹⁴

It has been stated that one hour of absence is equivalent to 2½ hours of production cost increases, and employee dissatisfaction, absenteeism and theft result in turnover costs which range from \$500 to \$7,000 per terminated employee, depending on the employee's place in the hierarchy.

The employees' needs will be met, and it seems reasonable to suppose that in doing so the employer's needs could also be met and some employee loyalty developed. There is, however, another curious aspect to the situation which gives pause and leads to hushed knowing discussion. This is pointed out in the article by Lawrence R. Zeittin, "A Little Larceny Can Do A Lot for Employee Morale." His studies reveal that in the retail business, ". . . internal losses outweigh external losses three to one. That is, the store's employees steal three times as much as do shoplifters."

Why does the dishonest worker spend so much energy figuring out ways to steal from his employer? . . . Most retail jobs are repetitive and boring. Advancement is limited, the typical worker has little freedom of action or decision-making autonomy. . . . Employee dissatisfaction is rife, and turnover is relatively high. . . . When the average retail employee becomes dissatisfied with his job, if he doesn't quit, he starts stealing . . . he gets back at the system. . . . The intellectual and physical challenges provided by opportunities to steal represent a

¹³ Mortimer R. Feinberg, Ph.D., "Employee Stealing on the Rise," Restaurant Business, Feb., 1982, p. 92.

¹⁴ Feinberg, p. 92.

¹⁵ Lawrence R. Zeittin, "A Little Larceny Can Do A Lot for Employee Morale," Psychology Today, June, 1971, p. 22.

significant enrichment of the individual's job. He can take matters into his own hands, assume responsibility, make decisions and face challenges. The amount he gets away with is determined solely by his own initiative."¹⁶

The dishonest worker is enriching his own job in a manner that is very satisfactory (for him). This enrichment is costing management on the average \$1.50 per worker per day. At this rate, management gets a bargain. By permitting a controlled amount¹⁷ of theft, management can avoid reorganizing jobs and raising wages.

Theft serves as a safety valve for employee frustration. It permits management to avoid the responsibility and the cost of job enrichment or salary increases at a relatively low amount of money per man.¹⁸

Uncontrolled theft can be disastrous for any business concern but controlled theft can be useful. Employee theft used¹⁹ as a motivational tool can be an economic benefit to the organization.

This curious state of affairs surely does exist. It is difficult to see how to control the amount of theft, when the amounts reach the \$44 billion-dollar level. When this happens, one must question the practice and its acceptance. It says much about all of us, and we must remember that practice doesn't excuse anything, even tolerable theft.

The very view we take of ourselves and each other as a god or a grunt determines expectations and often performance. Many see themselves controlled and manipulated, locked in dead-end jobs in an administered labor market. There are calls for greater productivity, greater industrial discipline and greater conformity, coupled with demands for concessions and retrenchment in expectations. There is grinding frustration at being told that you are the problem and the solution. Self-interest is for the entrepreneur, not the worker. At one end of the spectrum, we have workaholics limited to everything except guilt complexes. On the other end, thieves, saboteurs

¹⁷Zeittin, p. 26

¹⁸Zeittin, p. 64

¹⁹Zeittin, p. 64

and alcoholics. Buzzing around, behind and on these, are those who hustle, pimp, and push to survive. Cosmetic change by rigid entrenched interests masks authoritarianism, stifles growth, and preserves the status quo. We are blinded by the tyranny of the short-term goal. Have we become automatons in a pool? This is a bleak picture with bleak prospects for many.

Shall we do nothing and insure more of the same? Shall we redesign ourselves, our system? Where shall we begin? What do people say?

Some say we must specialize the education of the young so as to insure productivity. We must make education conform to market realities. High standards of living bring along with them high rates of cancer, pollution, and crime. It must be acknowledged that education is controlled by the controllers of society, not the educators. It is the industrial order that molds the plastic generations. It doesn't matter whether work is pleasant or unpleasant; it's just that the burden increases with the quantity of work and ultimately it's only performed for the income it yields. Much of the work done today is easy, dull, monotonous, mechanical, undemanding, and demeaning in lack of challenge. Is it any wonder that it has produced in some workers passivity, in others rebellion?

Life without purpose beyond securing minimum discomfort and maximum leisure yields no positive good. It's a zero-sum game. More and more in our society comes the realization that the gain of production is not mutually distributed. The call today is for increased productivity through increased specialization and increased monotony. Nobody believes in it anymore -- earnestness, zealousness, punctuality, thrift, dedication to toil -- toward what end? Greater Productivity? Technical innovation reduces the need for human skill. The monotony in mass production has produced monotonous products which we dispense with, with ever-increasing frequency.

What does the student need? Compression to fit the mold of short-term market demand? Old specialists have become generalists over a lifetime because science and technology have rendered their specialties obsolete. Are students a commodity like other commodities to be used, or are they something greater? Is education short-term or long-term goaling? The market place is controlled by the myopic view. Could this be why there is severe disquiet there? What are the job requirements -- this seems to be a backward view. Should it not be what are the student's requirements?

People resist depersonalization and conforming to segmented roles. Students are whole persons and must be treated as such; if not, this division of person will result, and has resulted in, ill-health, alienation, frustration, anger, and, in the eyes of some, the most calamitous event of all, lower production. What's to be done? Nothing, and insure more of the same, or redesign jobs and work organizations? Is this possible?

It is possible if you first redesign education. We must, and we must educate for uncertainty. A look at today's surplus of unemployed specialists tells us that. The same forces that control industry control education. Is it possible to change the education of students and thus change the status quo? Yes, if something other than specialized task competency is taught. Yes, if we free up the curriculum and the school day. Yes, if we practice democracy in education. Yes, if we let ethics into education. Yes, if we bring responsible freedom in as an organizing concept, not for division and dissolution, but for unity.

Many of today's managers are seen for what they are -- tinkers, fiddling, manipulating, hesitant, cautious, and most often, immobile. They attempt to fine-tune the system, not change it. Students educated in specialties know they are being short-changed, meeting others needs. They are not

being freed up but molded. Our society will not survive the vast numbers trammled. Today there is much talk about the lack of full employment of plant capacity. Little is said about the full employment of people's talents. The painful irony here is that those who can think cannot act, and those who can act cannot think. We must not educate students for others' needs, but for their own, for their self-actualizing. The call of today's power brokers is one of irrationalism and confusion. They see others in terms of themselves, one-dimensional. People become instruments to be used, not free men and women to grow. It gets worse when exploitation is cloaked in objective rationality, and the technological veil conceals inequality and enslavement. Control and determinations are made, the exploited outsiders, the unemployed and unemployable are stratified in a rigged game. Scientific, technical rationality and manipulation bring out new forms of social control. Today's example is the call by some congressmen for a national internal identification system (an internal passport) ostensibly needed to control illegal aliens. Today, in far too many cases, scientific engineering and administration have replaced constitutional rights and moral authority. Manipulation and psychological persuasion replace overt coercion where uncontrolled exterior forces are blamed. The anonymous "they" can't be questioned. This is not lost on the young.

Today's youth reject the nose-to-the-grindstone philosophy. They have seen the immorality and misuse of power and know who wields it. They know they must work within the system by making the best deal possible in a system where it's still greatest output over least cost. They know that jobs control, and they know they are in a dependent position. They see in education the only hope of opening up their options. This is true, if the education is open, if it has its own direction and control. The reward of

education is intrinsic with extrinsic application. We must question a culture where there is no intrinsic save what is manipulated from without. The young person knows that the system only needs part of him, so he tries to beat the system. As the technology brings in machines to replace men (who often simulate machines), the problem is compounded. What shall we do with a person specialized in only one function? We look at that quality ignored and bypassed on the road to specialization, the quality that will ultimately save the system -- man's adaptability. Fixed work roles will pass and, irony that it is, the specialization of tasks that created the need for the technological machine to replace men, creates in turn the demand for the generalist needed to run the system. Full circle, back to men and women who must know many things, be active in the enterprise, decisions, share profits, and have freedom of employment. Specializations' necessity has brought about the demise of the specialist and brought us back to dealing with the problems (mentioned above) created by the specialization of work roles.

The necessity of taking into account the whole person and educating that person as a whole is here, not because of humanitarian or moral imperatives, but practical necessity. The technology won't work without the many-sided talents, skills and knowledge of the most adaptable people we can educate. The more adaptable they are, the more employable they become, the greater their contribution, and, in turn, the greater their rewards and satisfactions. The needs of the system have undone the system and opened the way for the technical generalist, the master technician who knows many interacting reinforcing technical skills and can apply them. The technical generalist, the master technician will bring more to his employment and take more away from it.

What does the technical generalist need to know? He needs to know specifications, layout, fabrication, framing, tools, interpretation of drawings, surveying, measurements and calculations, systems, task analysis, geometric construction, machining, design, electricity, electronics, tool, die and mold-making, sheet metal, welding, electro-mechanical technology, machine tool process, painting, wood working, carpentry, hydraulics and pneumatics, pipefitting, masonry, plumbing, and this technical generalist, this master technician must be able to communicate.

Is this possible? It is! If we teach individuals in a multi-perspective manner so that they, by producing their own synthesis, gain a wide understanding in a multitude of skills; thus expanding their practical adaptability, and in turn solving some of the societal problems which at present seem beyond solution. The technical generalist would know more, be more employable, be able to use more skills, have greater adaptability and higher motivation. This technical generalist would need less retraining and make a greater contribution to our society.

An example of a two-year course of study for the education of a technical generalist follows:

It should be noted that this course of study could be adopted in Home Economics, Business/Office, Marketing/Distribution and Health areas.

The proposed two-year program of study is made up of sixteen areas which would be taught six hours per day, five days a week for six weeks. Every six weeks or 180 hours, the student would change course areas, transferring the skills/knowledges and relating them to the new area. The process would continue for 96 weeks. Evaluation, transfer and reinforcement of knowledge in one area would be keyed into the next area. Overall evaluation of the 96 weeks by placement, self-employment or recycling specialization

and follow-up conclude the process. The initial sixteen areas are:

Carpentry	Electronics
Cabinetmaking	Electro-Mechanical Technology
Masonry	Welding
Painting and Decorating	Machine Tool Process
Plumbing	Tool, Die and Mold
Drawing	Sheet Metal
Design Technology	Pipefitting
Electricity	Fluid Power Hydraulics & Pneumatics

The students would begin the school day at 6:00 a.m. and end at 12:00 noon. This would allow the vocational school to conduct the traditional program for 12:00 noon to 6:00 p.m., and the evening and/or extension program from 6:00 p.m. to 10:00 p.m. Further, it would allow the technical generalist student to work outside of school (another benefit in a declining labor force).

It is this educator's conviction that the student that is prepared in a wide variety of skills will not be alienated or apathetic, that this student won't be an anti-social isolationist given to theft and absenteeism, that this student will, all in all, make a greater contribution and be more productive all his life.

There is still a need for the specialist and a place for them, but not all must be specialists. If a person chooses to be a specialist, so be it. Let it be his or her choice. Similarly, let's open up the field so that the same person can be a generalist if he/she chooses to be.

The type of study recommended here will open up education, open up options, and free up men and women. It is a partial answer, and it needs doing.

What follows is a flowchart detailing the plan.

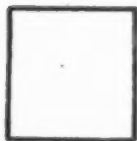
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**A SOCIO-TECHNICAL DESIGN MODEL
FOR
VOCATIONAL EDUCATION**

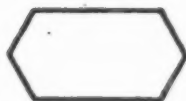
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Legend



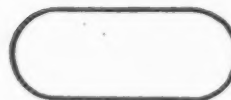
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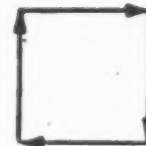
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**Decision
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End or Stop



**Flow
Direction**



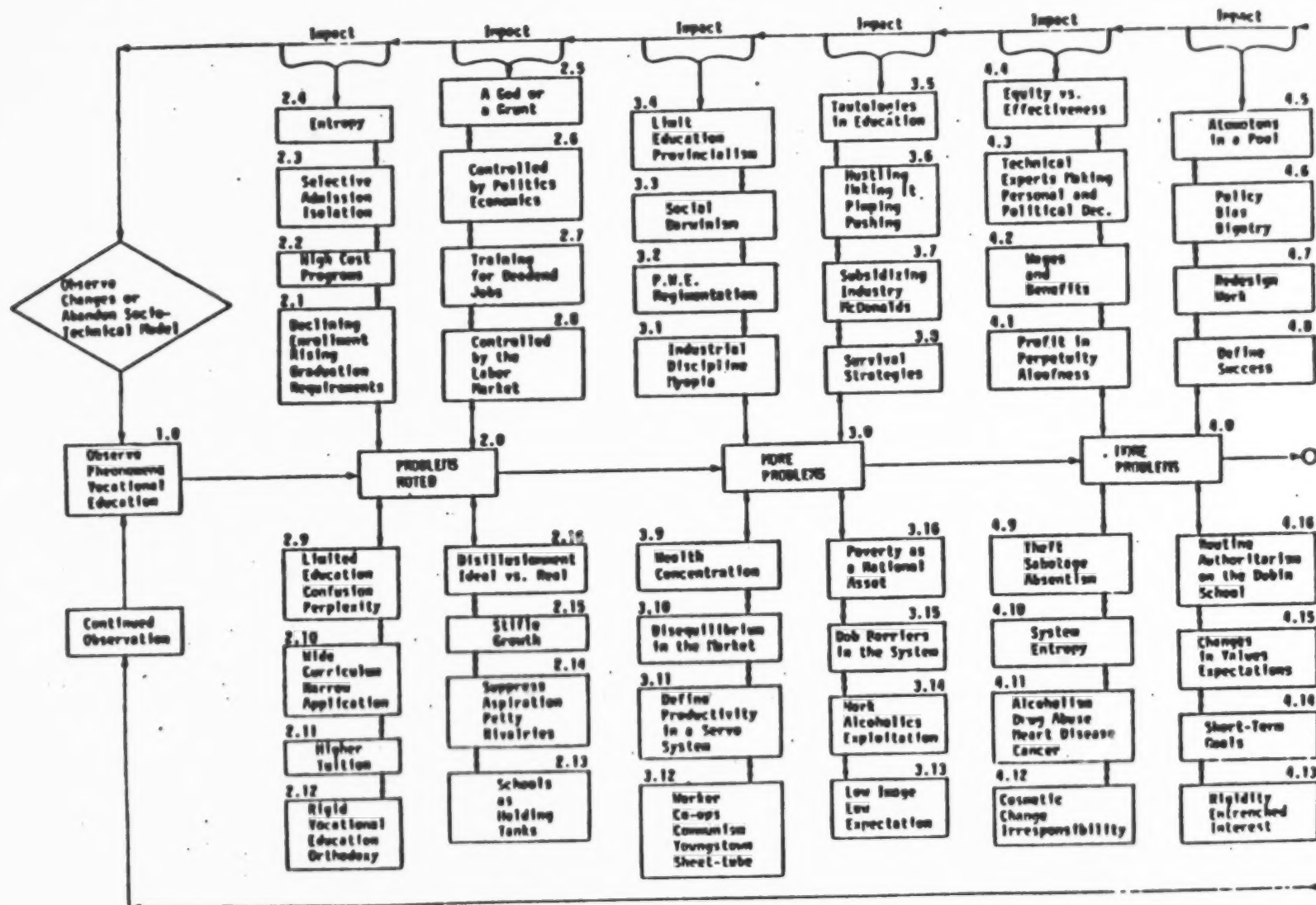
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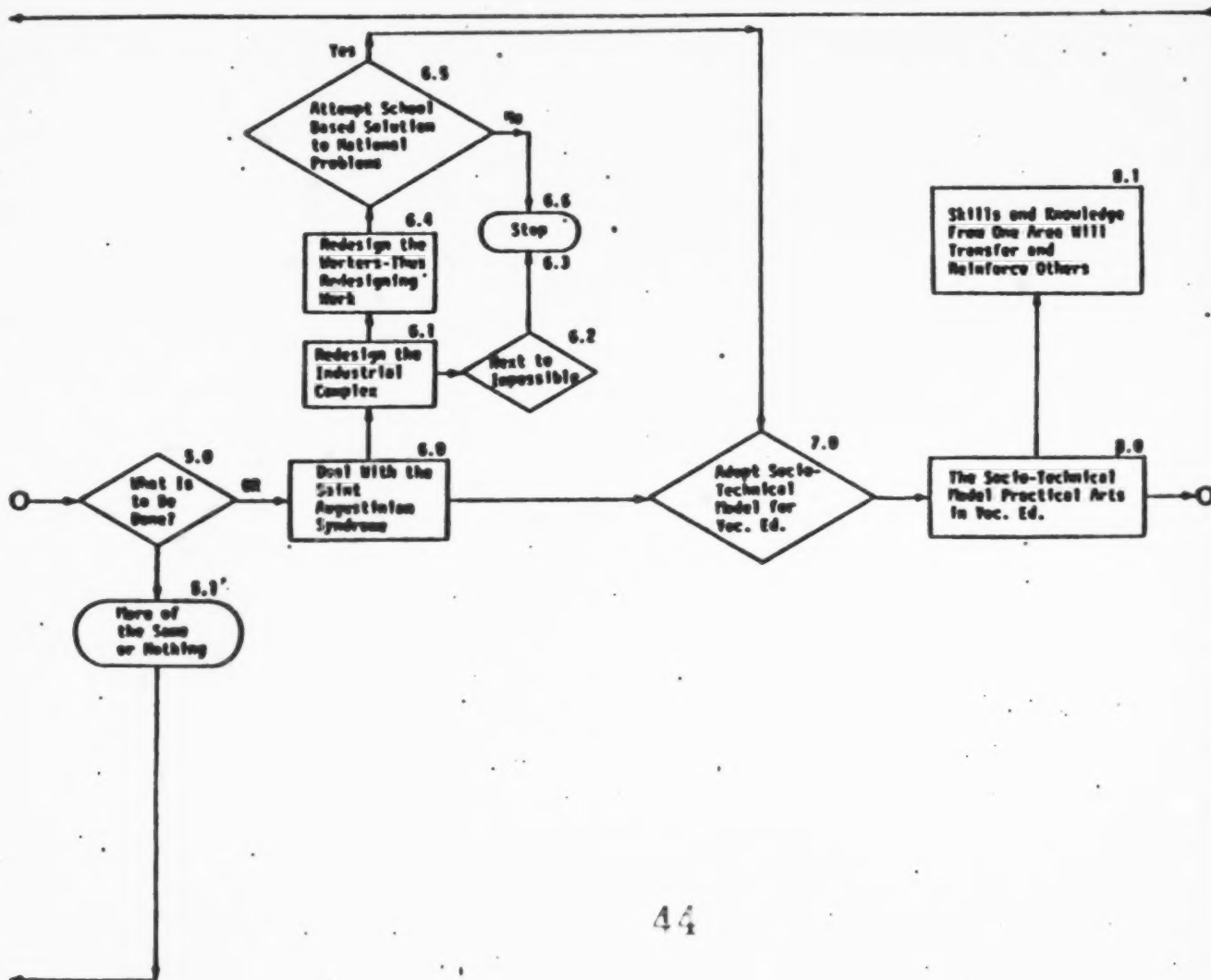
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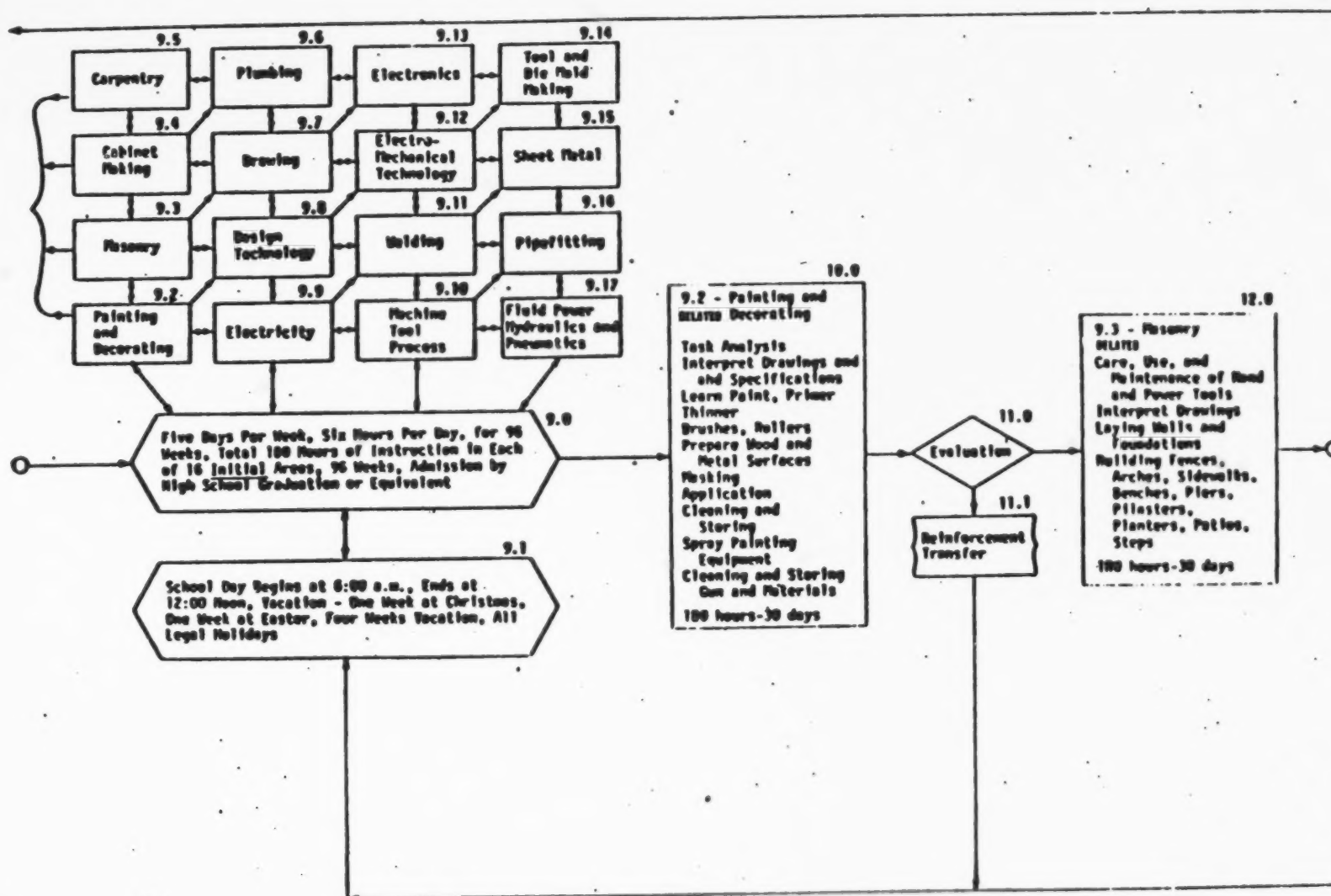
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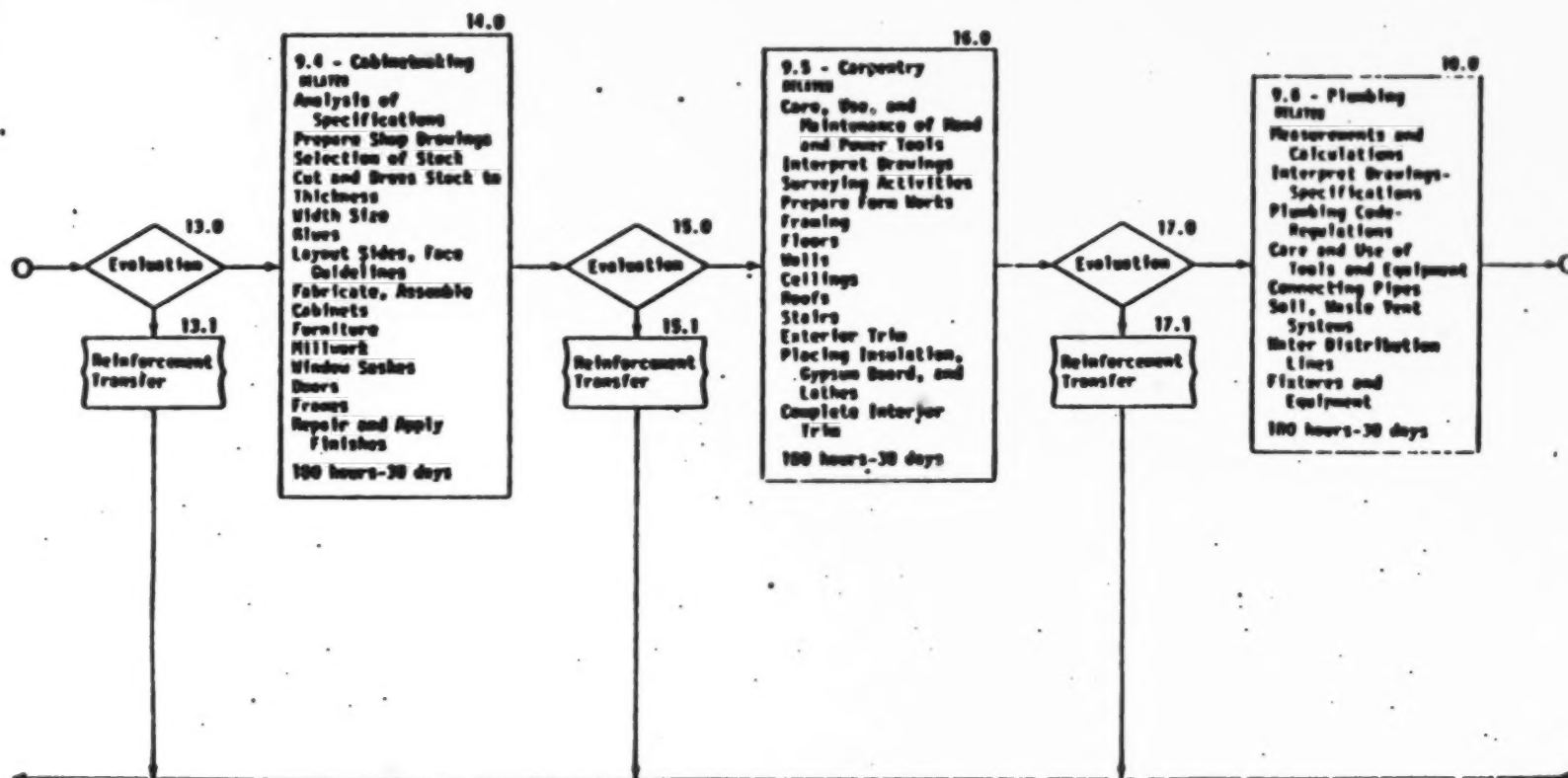
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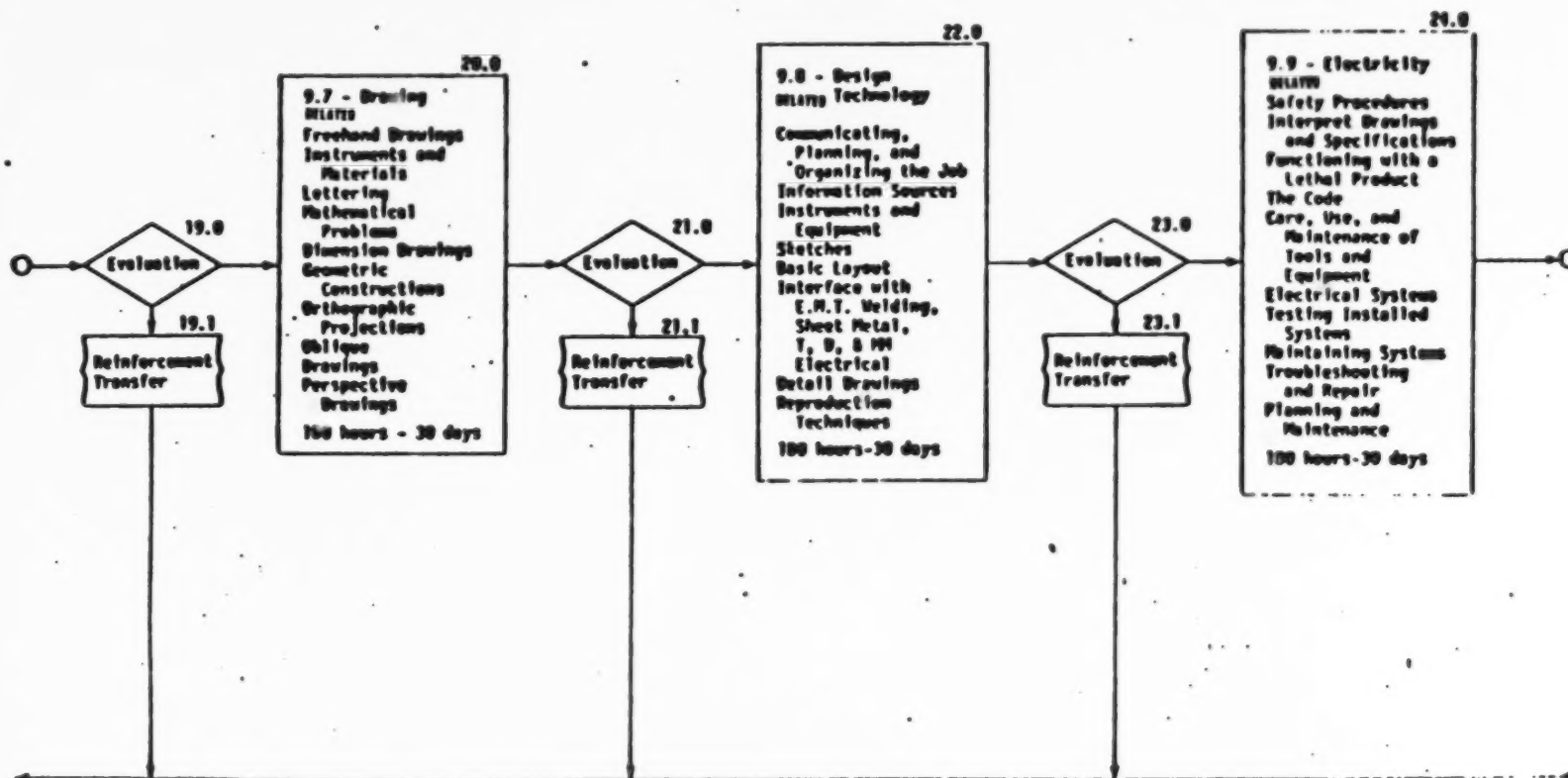
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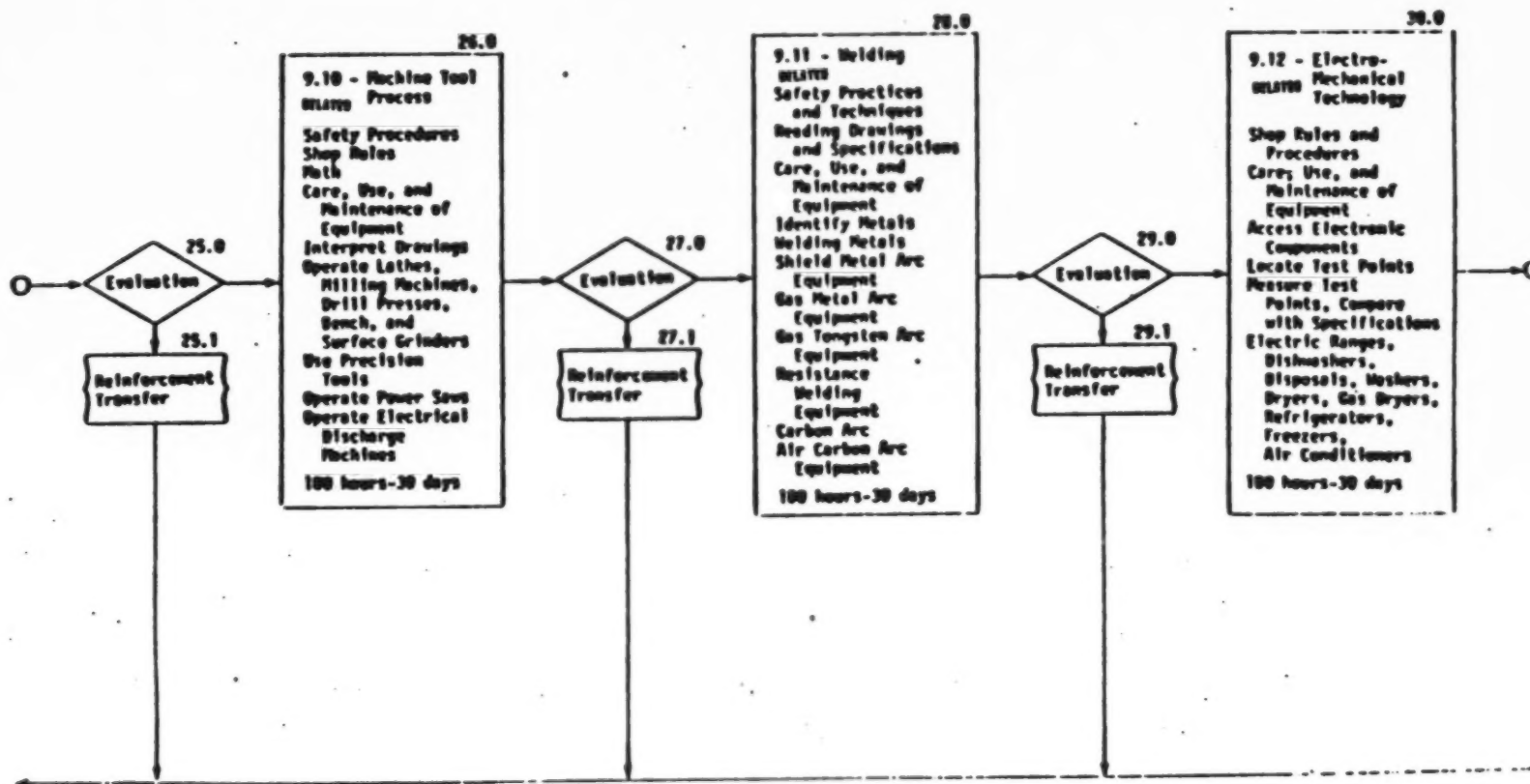


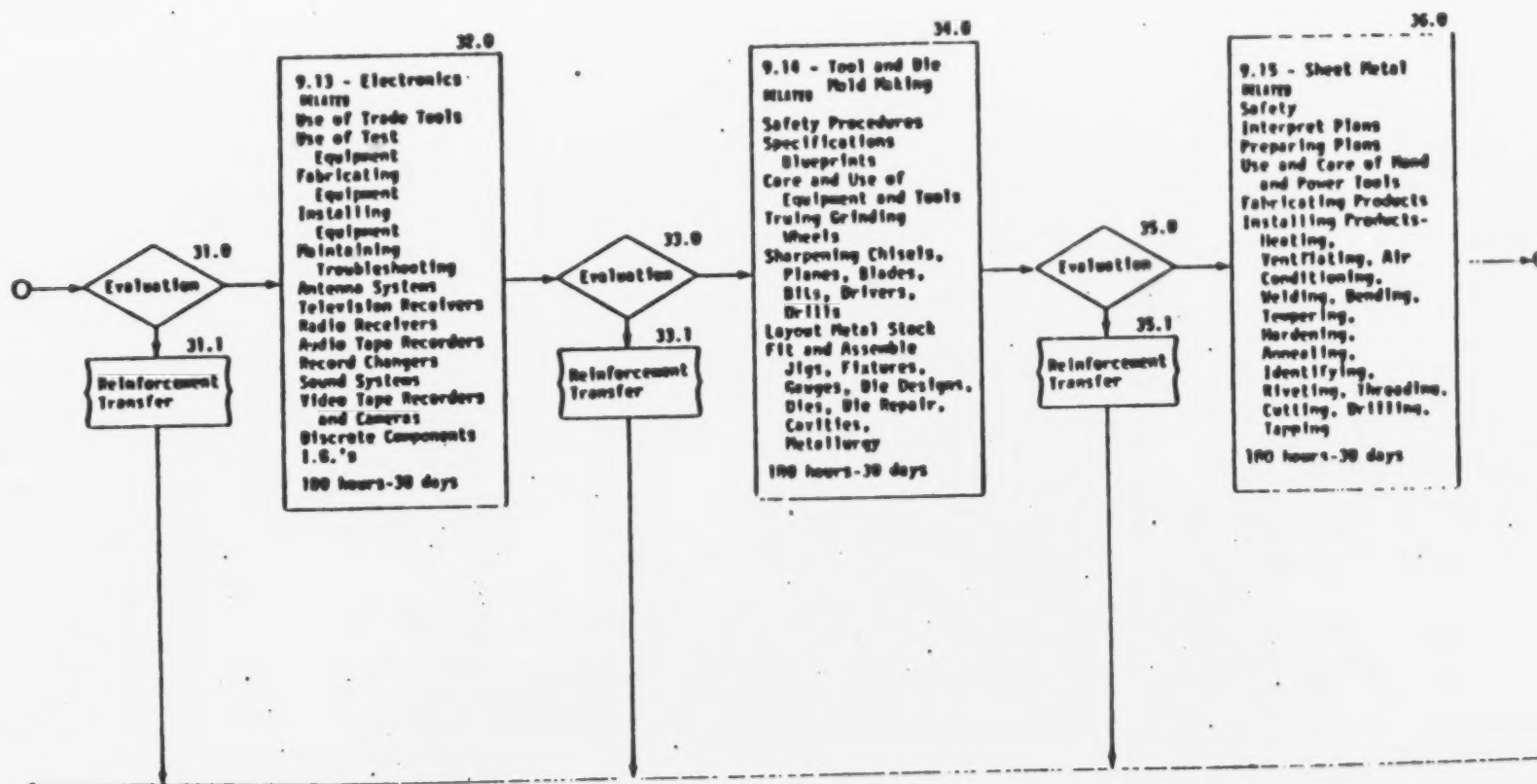


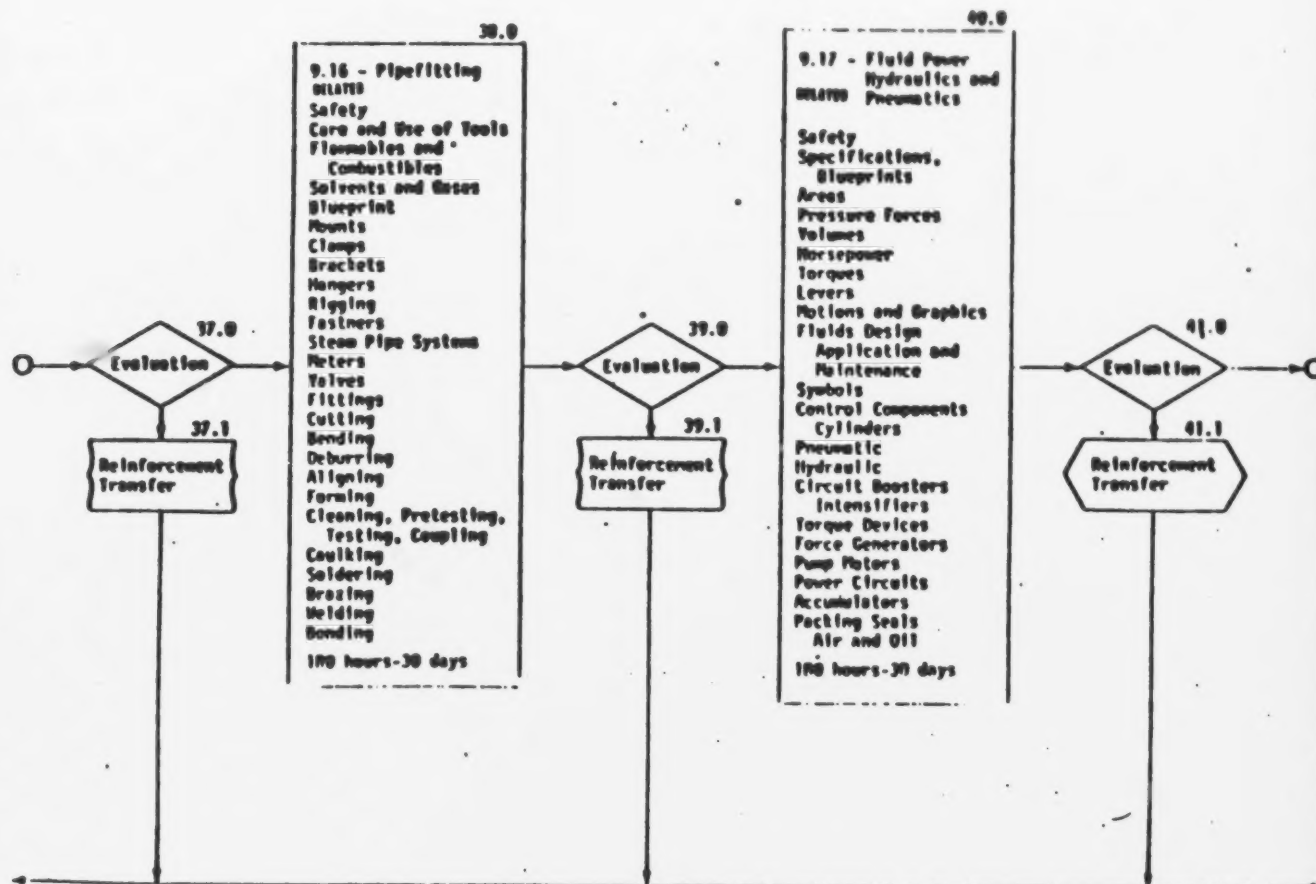


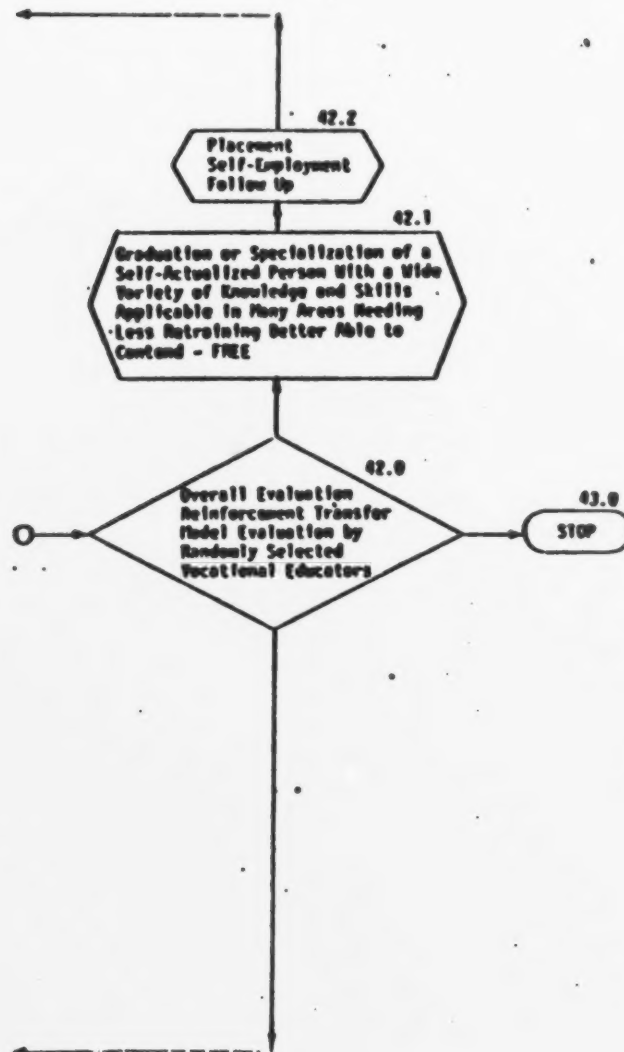












It's all connected, all part of one great whole and if we might
see it as the poet Blake saw it:

" A world in a grain of sand

A heaven in a wild flower

Hold infinity in the palm of your hand

And eternity in an hour."

1 A bill for an act

2 relating to vocational technical education; requiring
3 the state board to establish a two-year pilot program
4 at a vocational technical institute for vocational
5 generalist; appropriating money; amending Minnesota
6 Statutes 1984, section 136C.04, by adding a
7 subdivision.

8
9 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

10 Section 1. Minnesota Statutes 1984, section 136C.04, is
11 amended by adding a subdivision to read:

12 Subd. 12a. [VOCATIONAL GENERALIST PROGRAM.] The state
13 board shall establish a two-year pilot program for vocational
14 generalists at a vocational technical institute. The program
15 must require 180 hours of instruction in each of the following:
16 carpentry, cabinet making, masonry, painting and decorating,
17 plumbing, drawing, design technology, electricity, electronics,
18 electro-mechanical technology, welding, machine tool process,
19 tool and die mold making, sheet metal, pipefitting, and fluid
20 power hydraulics and pneumatics. The program must provide that
21 after each area of instruction is completed, a student must be
22 given an assessment test to measure the student's understanding
23 of the completed area. The hours of the program must not
24 inhibit students from keeping or seeking employment.

25 Sec. 2. [APPROPRIATION.]

26 \$..... is appropriated in fiscal year 1986 from the
27 general fund to the state board of vocational technical
28 education for the additional faculty, supplies, and equipment
29 required for the program described in section 1. The
30 appropriation is available until June 30, 1987.